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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,287	07/30/2001	Uwe Benz	843/42636CO	9321
7590	10/01/2004		EXAMINER	
CROWELL & MORING, L.L.P.			TRAN, HIEN THI	
P.O. Box 14300			ART UNIT	PAPER NUMBER
Washington, DC 20044-4300			1764	

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/916,287	BENZ, UWE	
	Examiner	Art Unit	
	Hien Tran	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 08/585,685.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/30/01</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 08/585,685, filed on 1/16/96.*Drawings*

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the nitrogen oxide reduction reactor (claims 26, 45), the feed device (claims 36, 37) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

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3. The drawings have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the drawings to comply with CFR 1.84(p)(5), e.g. they should include the reference sign(s) mentioned in the specification and vice versa.

Specification

4. The disclosure is objected to because of the following informalities:

On page 7, line 16 apparently "hydrocarbon" should be changed to --methanol-- (note Fig. 1 and page 4, line 21).

On page 8, line 13 --or electrical heater-- should be inserted before "20" (note line 3); in line 16 "2" should be changed to --12-- (note line 12).

On page 10, line 16 --or main reaction stage-- should be inserted before "32" (note lines 6-7).

Appropriate correction is required.

5. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 26-45 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one

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skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Specifically, the limitation of "so as not to be in thermal contact with the exhaust stream of the motor vehicle" (claims 26 and 45) is nowhere disclosed in the original specification.

This is a new matter rejection.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 33, 38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 33, lines 3-5 it is unclear as to how the heating means is related to the heating device set forth in claim 26.

In claim 38, lines 7-10 it is unclear as to what structural limitation applicant is attempting to recite.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 26-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 537,968 (Oshima et al) in view of Frazer (1,789,812).

As discussed in the above 112, 1st paragraph rejection, the limitation of “so as not to be in thermal contact with the exhaust stream of the motor vehicle” introduces new matter. Therefore the difference between the claimed device and that of the prior art cannot be identified by the specification of the instant application.

With respect to claims 26, 45, EP 537,968 discloses a nitrogen oxide reduction apparatus for an internal combustion engine comprising:

a reactor 2 containing a catalyst on which nitrogen oxide from exhaust of a motor vehicle is reduced via addition of hydrogen;

a device 102 arranged on-board of the motor vehicle for generating hydrogen; said generating device including at least one of a water vapor reformation reactor for water vapor reformation of HC on a catalyst and a partial oxidation reactor for partial oxidation of HC on a catalyst (col. 4, lines 41-58, col. 5, lines 1-14); and

an adjustable heating device (i.e. the bypass valve 110 and exhaust bypass conduit 111) coupled with at least one of the water vapor reformation reactor and the partial oxidation reactor.

The device 102 in EP 537,968 is a separate module arranged outside (i.e. surrounding) the exhaust pipe 101 of the motor vehicle (Fig. 1).

As best understood, the apparatus of EP 537,968 is substantially the same as that instantly claimed, but fails to disclose whether the heating device may be an electrical heater so as to heat the hydrogen generating device instead of using exhaust gas.

However, Frazer discloses the conventionality of heating the catalyst by heated gas or electrical heater or both (col. 2, lines 70-91, col. 3, lines 125-130, col. 4, lines 8-15).

It would have been obvious to one having ordinary skill in the art to substitute the electric heater of Frazer for the heated gas stream of EP 537,968 since the art recognized functional equivalency of electric heater and heated gas and since both are effective means for heating the catalyst to the operating temperature thereof. Since the hydrogen generating device of the EP 537,968 as modified by Frazer uses the electric heater instead of the exhaust gas, there is not need to locate the hydrogen generating device in thermal contact with the exhaust gas thereof.

With respect to claims 27-28, Frazer discloses the electrical resistance heater 42.

With respect to claim 29, EP 537,968 discloses that the catalyst comprises at least one of copper and zinc (col. 4, lines 41-58, col. 5, lines 1-14).

With respect to claims 30, 34, EP 537,968 discloses that the water vapor reformation reactor or the partial oxidation reactor further comprises an evaporator stage upstream of a main reaction stage in which the water vapor reformation on the catalyst occurs (col. 4, lines 41-58, col. 8, lines 15-22, Fig. 8).

With respect to claims 31, 38, 39, EP 537,968 discloses that the water vapor reformation reactor or the partial oxidation reactor further comprises an after treatment stage downstream of a

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main reaction stage in which the water vapor reformation on the catalyst occurs wherein in said after treatment stage, CO produced together with hydrogen is reduced by a shift reaction and a hydrogen yield is inherently increased (col. 8, lines 49-55).

With respect to claims 32, 40-41, EP 537,968 discloses the reactor for water vapor reformation or for partial oxidation is a tube, but is silent as to the specific diameter of the tube.

However, it would have been obvious to one having ordinary skill in the art to select an appropriate diameter for the reaction tube as to discover the optimum range within the prior art general conditions has been held to be obvious. In *re Aller et al* 105 USPQ 233.

With respect to claims 33, 35, providing a separate heating means for each stage of the reactor is within the purview of one having ordinary skill in the art during routine experimentation and optimization of the system, i.e. to facilitate the controlling of each stage.

With respect to claims 36, 37, EP 537,968 discloses that a feed device which product gas produced during said partial oxidation on the catalyst is guided against an outer wall of the partial oxidation reactor (note Fig. 6). It would have been obvious to one having ordinary skill in the art to alternately arrange the feed pipe so as to guide the product gas against the outer wall of the reactor as shown in Fig. 6 of EP 537,968, on the basis of its suitability for the intended use as a matter of obvious design choice.

With respect to claims 42-43, it would have been obvious to one having ordinary skill in the art to rearrange the stages within the reactor so as to better receive the heat from the central heating means during routine experimentation and optimization of the system.

With respect to claim 44, the device 102 in EP 537,968 is a separate module arranged outside (i.e. surrounding) the exhaust pipe 101 of the motor vehicle (Fig. 1).

Response to Arguments

13. Applicant's arguments filed 7/30/01 have been fully considered but they are not persuasive.

Applicant argues that the instant claims 26 and 45 are not anticipated by EP '948 since the instant claims now recite that the hydrogen generating device is not in thermal contact with the exhaust stream. However, as discussed in the above 112, 1st paragraph rejection, the limitation of "so as not to be in thermal contact with the exhaust stream of the motor vehicle" in instant claims 26 and 45 introduces new matter. Therefore the difference between the claimed device and that of the prior art cannot be identified by the specification of the instant application. Furthermore, the introduction of Frazer overcomes such argument.

Applicant argues that the Frazer merely discloses preheating the catalyst for subsequent heating by exhaust gas. Such contention is not persuasive as Frazer is relied upon for teaching the conventionality of heating the catalyst either by heated gas or electrical heater or both (col. 2, lines 70-91, col. 3, lines 125-130, col. 4, lines 8-15). It would have been obvious to one having ordinary skill in the art to substitute the electrical heater of Frazer for the heating means of EP 537,968 since the art recognized functional equivalency of electric heater and heated gas and since both are effective means for heating the catalyst to the operating temperature thereof. Since the hydrogen generating device of the EP 537,968 as modified by Frazer uses the electric heater instead of the exhaust gas, there is not need to locate the hydrogen generating device in thermal contact with the exhaust gas thereof.

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Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hien Tran whose telephone number is (571) 272-1454. The examiner can normally be reached on Tuesday-Friday from 7:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HT
September 27, 2004

Hien Tran

**Hien Tran
Primary Examiner
Art Unit 1764**